

# **Configuration Notes**

## **Motorola WLAN Infrastructure in Ascom VoWiFi System**

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## 1 Introduction

This document is merely intended as a guide when using the Motorola Enterprise Wireless LAN in the Ascom VoWiFi system, and it does not by any means replace the documentation from Motorola. This document describes some of the settings needed to gain good performance when the Ascom VoWiFi handset is used with the Motorola WLAN infrastructure. Performance parameters will also be stated.

For maximum performance in the VoWiFi system consider the recommendations in the document *Considerations for Ascom VoWiFi System Planning, TD 92408GB*.

The settings described in this document are extensions and apply for use with the Motorola wireless switches and access ports. For more information refer to *Function Description VoWiFi System, TD 92314GB*.

**Note:** The performance measurements are made with a Motorola WS5100 wireless switch with AP300 access ports running software version 3.1.0.0-045

### 1.1 Abbreviations and Glossary

AP	Access Port: a radio transceiver providing LAN connection to wireless devices.
BSS	Basic Service Set
CoS	Class of Service
DSCP	Differentiated Services Code Point
EDCA	Enhanced Distributed Channel Access
IP	Internet Protocol: global standard that specifies the format of datagrams, and the addressing scheme.
QoS	Quality of Service
STA	Station: a mobile device in an IEEE802.11 WLAN system
U-APSD	Unscheduled Automatic Power Save Delivery
WLAN	Wireless Local Area Network
WMM™	Wi-Fi Multimedia™: offers QoS functionality for WiFi networks.

## 2 Configuration

### 2.1 Radio Settings

#### 2.1.1 Radio Channels

Use only channels 1, 6 and 11.

#### 2.1.2 Data Rates

The default settings will work fine but to optimize it is recommended to disallow 802.11b clients to associate by setting the 6 MBit/s rate to mandatory.

It is also highly recommended to disable all lower 802.11b speeds in the Motorola infrastructure to obtain even higher performance:

- Transmission rate 1, 2, 5.5 should be disabled
- Transmission rate 6 should be set as mandatory
- Other rates should be set as supported

### 2.2 Quality of Service (QoS)

#### 2.2.1 If Layer 3 Priority is Used

In order to map to the default Ascom VoWiFi handset configuration the QoS DSCP to 802.1p prioritization mapping shall be set according to the following:

- 802.1p to Access Category  
802.1p priority 7 shall map to Access Category voice6.
- DSCP to Access Category  
DSCP 26 (Assured Forwarding 31) shall map to Access Category video4.  
DSCP 46 (Expedited Forwarding) shall map to Access Category voice6.

#### 2.2.2 WMM Power Save

If U-APSD shall be used in the handset it is very important that the WMM parameters in the wireless switch are set correctly as described in [2.2.1 If Layer 3 Priority is Used](#) on page 2.

The QoS must be configured correctly, since U-APSD handles a bi-directional data stream where the up- and downlink must be transmitted within the same EDCA Access Category.

To use U-APSD, make sure to enable voice prioritization for the ESSID used. Also set Access Category to Automatic/WMM for the ESSID.

### 2.3 Security Settings

#### 2.3.1 Fast roaming (802.1x only)

If 802.1x (WPA2) is used PMK Caching and Opportunistic Key Caching should be enabled. This enables high security with fast roaming.

### 3 Call Capacity

If voice power save mode "Active" is used the Motorola WLAN infrastructure can handle up to 20 calls per AP. If voice power save mode "U-APSD" is used it can handle up to 22 calls per AP. This applies if no data traffic is present and no channel re-use is needed.

Depending on the data traffic load, cell coverage and co-channel interference, the capacity might be reduced to around 10 calls per AP.

If using 802.11bg (instead of a pure 802.11g system) the call capacity may decrease even more.

### 4 Handover Performance

The handover performance is heavily dependant on the chosen security scheme. The authentication process, as well as the exchange of fresh session encryption keys, affects the time needed to perform an inter-BSS transition before the transmission of speech frames can be resumed.

The table shows an average of handover times with different security settings. The stated times shall be seen as a guide and an assistance in the choice of security scheme and shall not be seen as absolute numbers. A number of factors such as external RADIUS server performance, channel usage etc. will affect the handover time.

Authentication scheme	Encryption type	Handover time
Open	NONE	~ 14 ms
Open	WEP	~ 43 ms
WPA-PSK	TKIP	~ 2 s <sup>1</sup>
WPA2-PSK	AES-CCMP	~ 66 ms
PEAP-MSCHAPv2 with opportunistic key caching	AES-CCMP	~ 49 ms

1. See Limitations below

### 5 Limitations

#### DTIM period

In the Motorola WLAN infrastructure, the Ascom VoWiFi handset does not work well if the DTIM period is set to 5, therefore a DTIM period of 1 is recommended. This will however shorten the battery life in idle mode dramatically (~18h instead of ~40h).

Make sure to set the DTIM period to 5 if this limitation is fixed in a future software from Motorola or Ascom.

#### WPA-PSK with TKIP encryption

The Ascom VoWiFi handset does not perform well in a Motorola WLAN infrastructure if the security scheme is set to WPA-PSK with TKIP encryption (2 seconds roamings). Consider to use WPA2-PSK with AES encryption instead if a pre-shared key scheme will be used.

## 6 Related Documents

System Description VoWiFi System	TD 92313GB
Function Description VoWiFi System	TD 92314GB
Considerations for Ascom VoWiFi System Planning	TD 92408GB
Configuration Manual i75 VoWiFi Handset	TD 92431GB
Installation and Operation Manual Integrated Message Server (IMS/IP-WiFi)	TD 92322GB
Installation and Operation Manual Portable Device Manager, Windows version	TD 92325GB
Installation and Operation Manual Portable Device Manager, System version	TD 92378GB

## 7 Document History

For details in the latest version, see change bars in the document.

Version	Date	Description
A	2008-10-27	First released version.